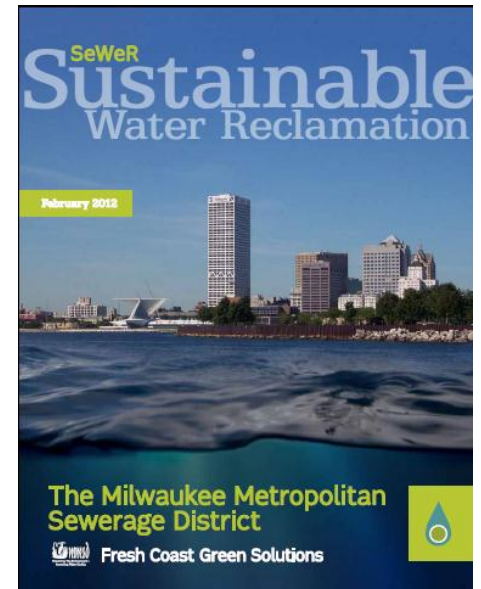


Milwaukee's Green and Grey Vision

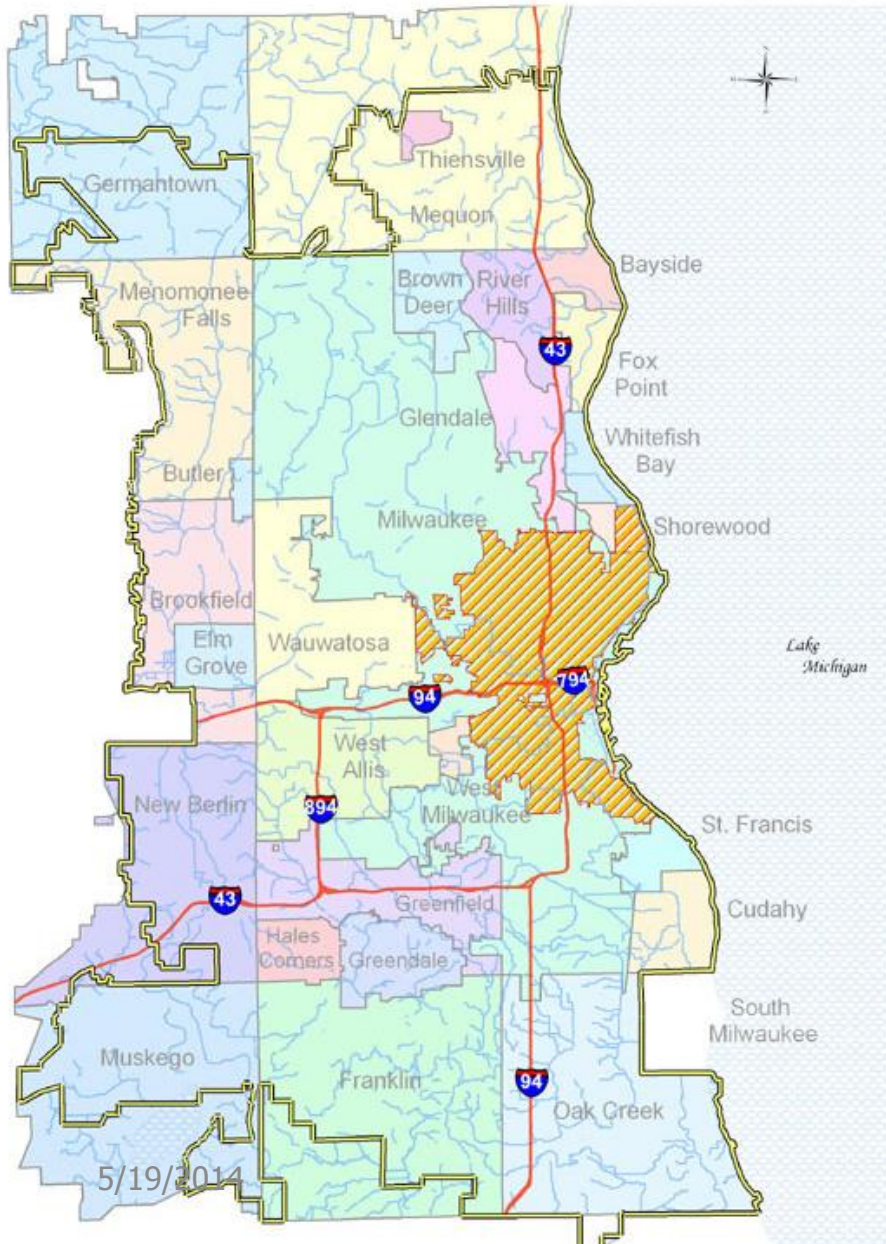
*Kevin L. Shafer, P.E.
Executive Director*



Milwaukee Metropolitan Sewerage District



Milwaukee Metropolitan Sewerage District



We Serve:

- 1.1 Million Customers
- 28 Municipalities
- 411 Square Miles

We Protect the Public & Lake Michigan:

- Convey/Store/Reclaim Wastewater
- Manage Flooding

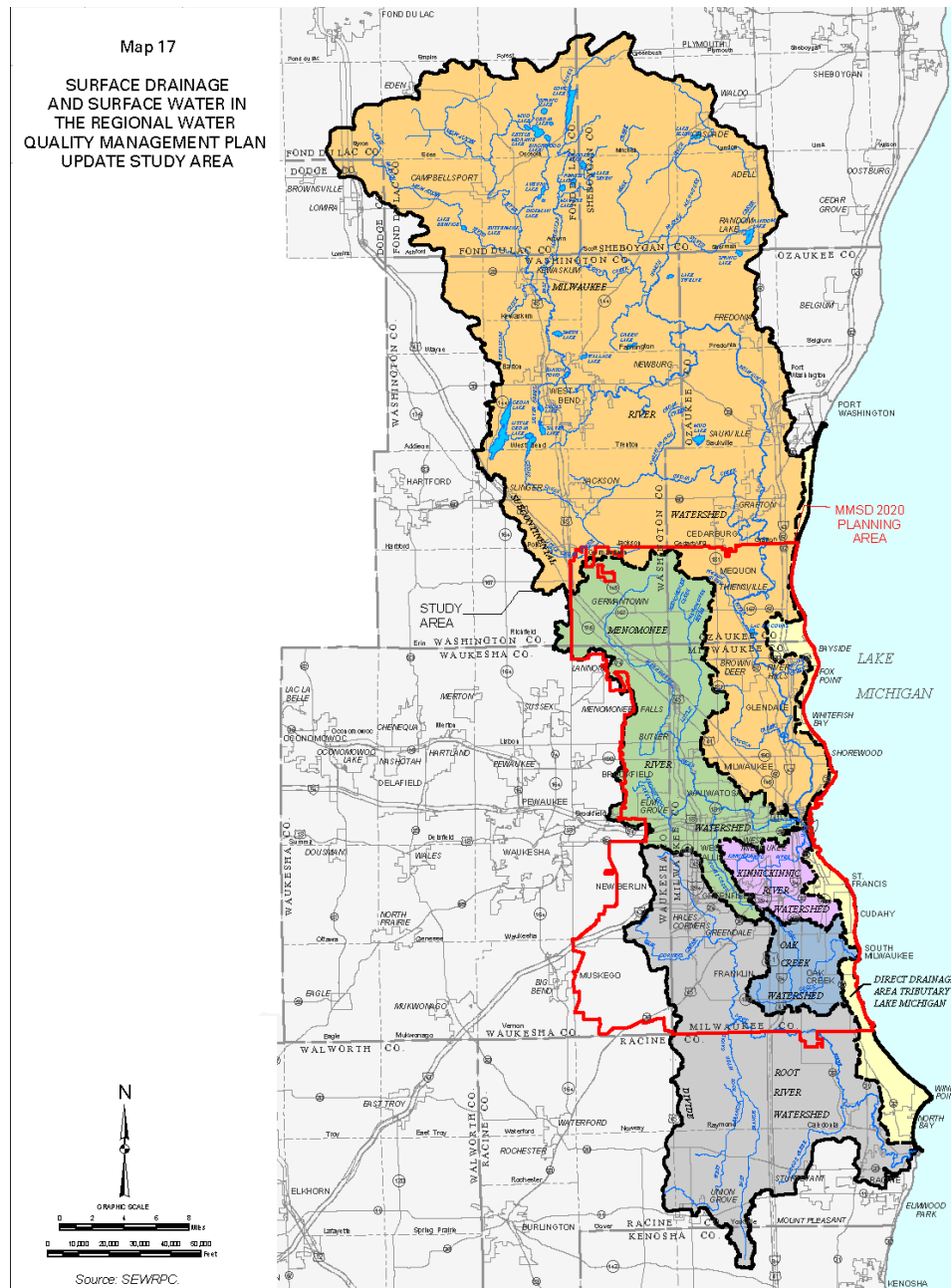
We Have:

- 300 Miles of Sewers (Municipalities and individuals have 6,000 miles!)
- 521 MG Tunnel System
- 2 Water Reclamation Facilities

The Water Quality Initiative

A Watershed Approach

<u>Watershed</u>	<u>Area (square miles)</u>
Kinnickinnic River	24.7
Menomonee River	135.8
Milwaukee River	700.0
Oak Creek	28.2
Root River	197.6
Lake Michigan Direct	40.7
Drainage Area	
Total	1,127.0
Number of Counties	9
Number of Local Municipalities	83



Water Reclamation Facilities

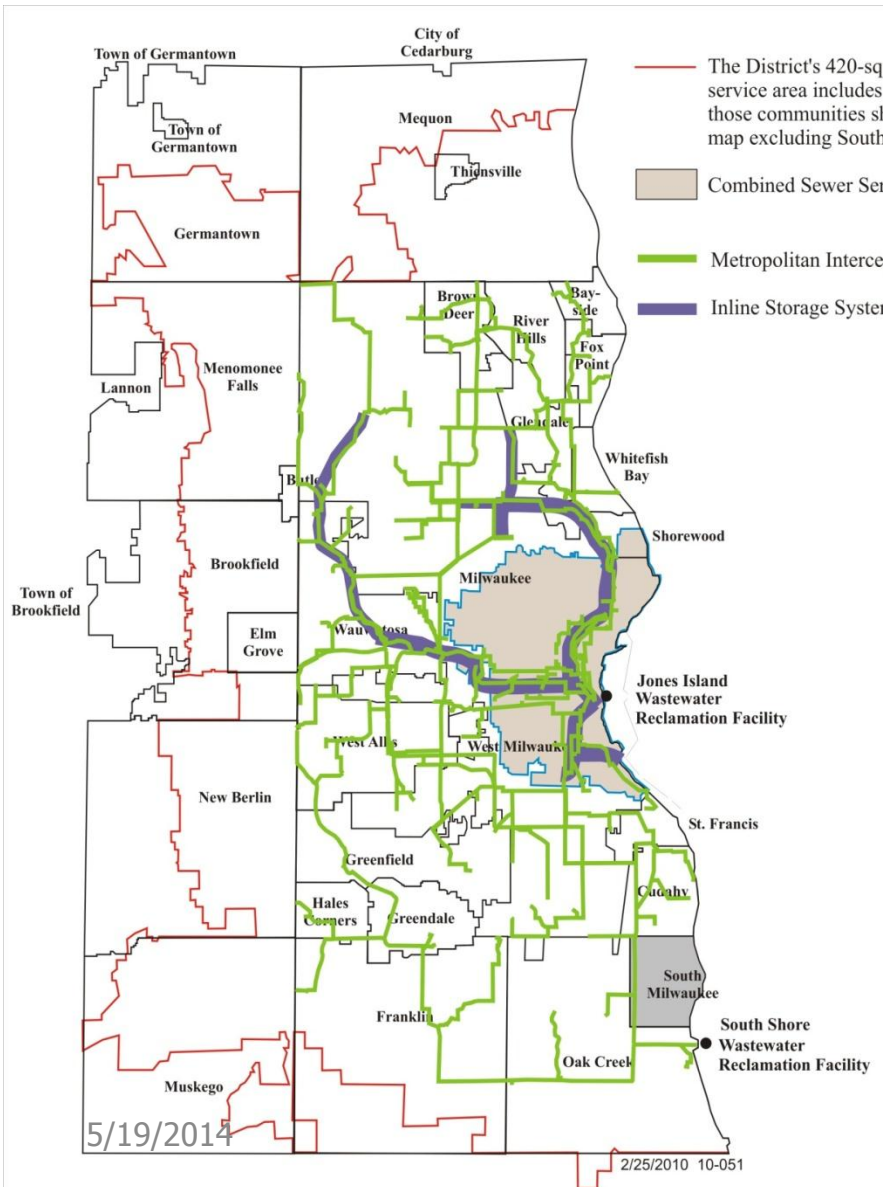


Jones Island



South Shore

The Region's Sewers



300 Miles
MMSD Sewers

3,000 Miles
Municipally Owned Sewers

3,000 Miles
Private Laterals

Deep Tunnels

A photograph of a large, circular tunnel under construction. The tunnel has a concrete lining with visible horizontal segments. The top half of the tunnel is covered with a blue tarp. A small vehicle is visible at the end of the tunnel, and there is some construction equipment and cables on the right side.

300 Feet
Below ground

521 Million
Gallons of Storage

28.5 Miles
Long

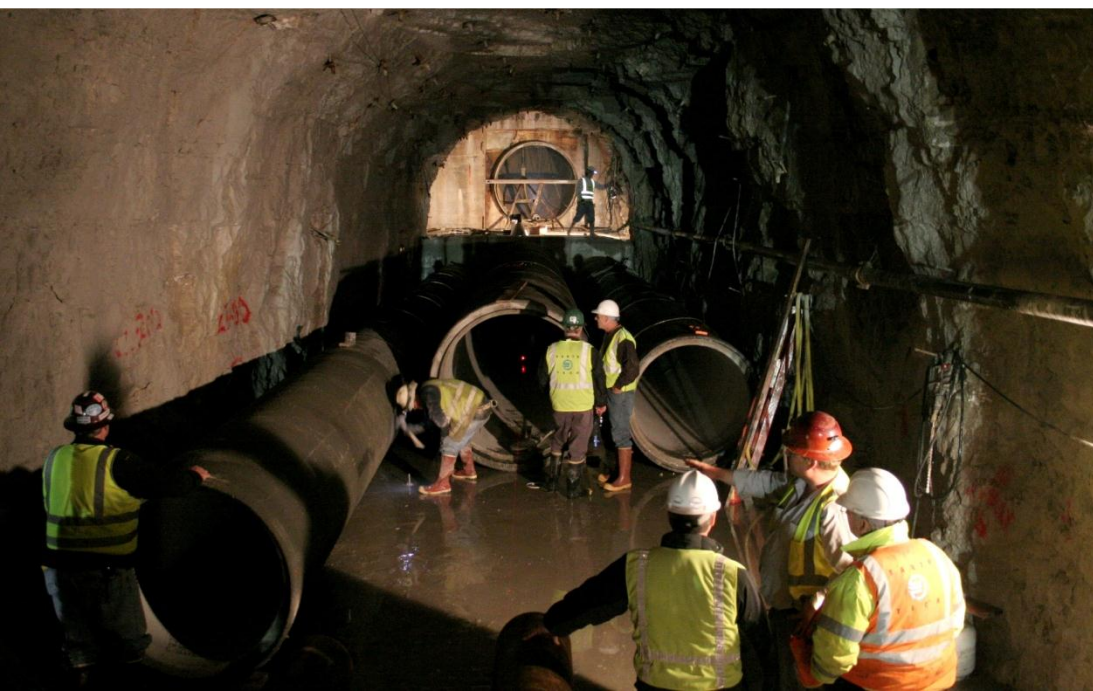
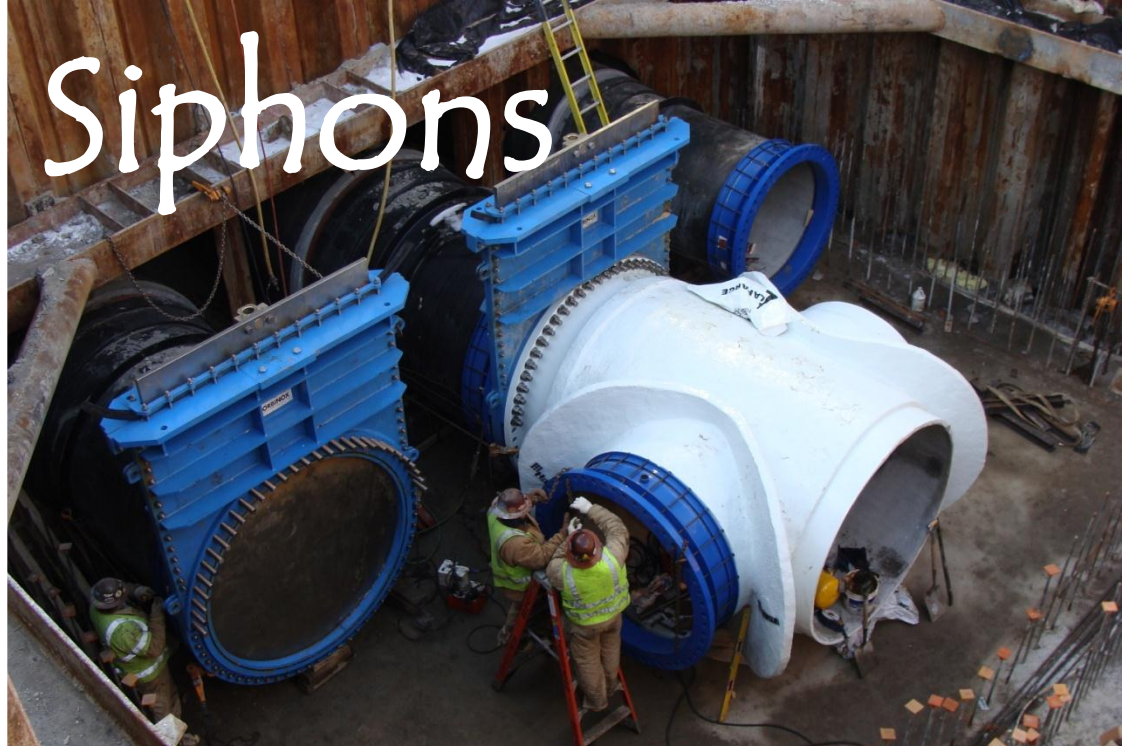
17- to 32-feet
In Diameter

Designed to
minimize basement
backups and for 1-2
overflows per year.

Harbor



Siphons



% OF VOLUMES CAPTURED & CLEANED

**TOTAL
PERCENT
CAPTURE
98.3%**

1994	99.7%	1999	94.8%	2004	97.9%	2009	98.3%
1995	98.9%	2000	95.6%	2005	99.6%	2010	96.1%
1996	99.0%	2001	99.3%	2006	99.9%	2011	99.7%
1997	97.1%	2002	99.3%	2007	99.2%	2012	99.9%
1998	99.1%	2003	99.9%	2008	95.1%	2013	98.5%

MMSD's 2035 Vision

(<http://v3.mmsd.com/NewsDetails.aspx>)

Integrated Watershed Management Goals:

Zero sanitary sewer overflows

Zero combined sewer overflows

Zero homes in the 100 year floodplain

Acquire an additional 10,000 acres of river buffers through Greenseams®

Use green infrastructure to capture the first 0.5 inch of rainfall

Harvest the first 0.25 gallons per square foot of area of rainfall

Energy Efficiency and Climate Mitigation & Adaptation Goals:

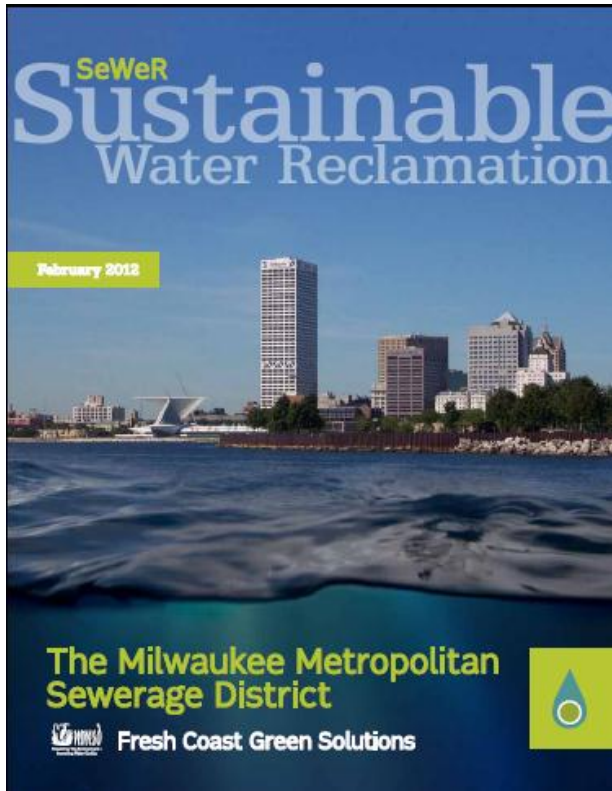
Meet 100% of MMSD's energy needs with renewable energy sources

Meet 80% of MMSD's energy needs with internal, renewable sources

Use the Greenseams® Program to provide for 30% sequestration of MMSD's carbon footprint

Reduce MMSD's carbon footprint by 90% from its 2005 baseline

MMSD's Sustainability Plan



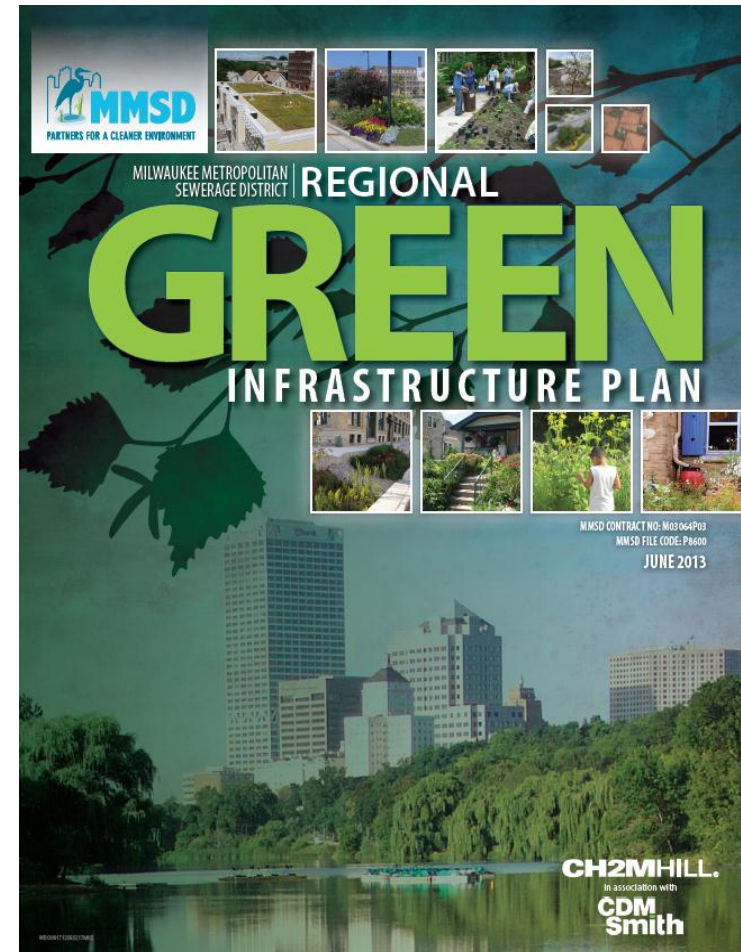
Although the region is rich in water, there is a recognition that water is a resource not to be squandered, but rather used for the gift it is. We do our part to manage that gift well, stewarding regional efforts and innovating approaches to carry us through the future.

MMSD's Regional Green Infrastructure Plan

- Meet new discharge permit requirement
- Capture the first 0.5" that falls on impervious surfaces or an additional 740 MG
- Prioritize green infrastructure projects



Milwaukee Metropolitan Sewerage District





You have to start with a grey backbone...

- **Treatment Plants**
- **Sewers**
- **Storage Vessels...**

To go Green...

- **Rain Barrels**
- **Rain Gardens**
- **Bioretention...**

Green Infrastructure In Our 2013 Permit

4.10 Wet Weather Management – Green Infrastructure

“...The practices/control measures put in place in 2013 must cumulatively have a design retention capacity of at least 1 million gallons, and each following calendar year during the permit term an additional 1 million gallons of green infrastructure retention capacity must be put in place...”

What is Green Infrastructure (GI)?

10 GREEN INFRASTRUCTURE DEFINITIONS

Green infrastructure is an approach to wet weather management that is cost-effective, sustainable, and environmentally friendly. At the largest scale, the preservation and restoration of natural landscape features (such as forests, floodplains and wetlands) are critical components of green stormwater infrastructure. By protecting these ecologically sensitive areas, communities can improve water quality while providing wildlife habitat and opportunities for outdoor recreation. On a smaller scale, green infrastructure practices include strategies such as rain gardens, porous pavements, green roofs, infiltration planters, trees and tree boxes, and rainwater harvesting for non-potable uses such as toilet flushing and landscape irrigation.



GREENWAYS

Greenways



RAIN GARDENS

Rain Gardens



BIO-SWALES

Bioswales



POROUS PAVEMENT

Porous Pavement



WETLANDS

Wetlands



STORMWATER TREES

Stormwater
Trees



NATIVE LANDSCAPING

Native
Landscaping



RAINWATER CATCHMENT

Rainwater
Catchment



GREEN ROOFS

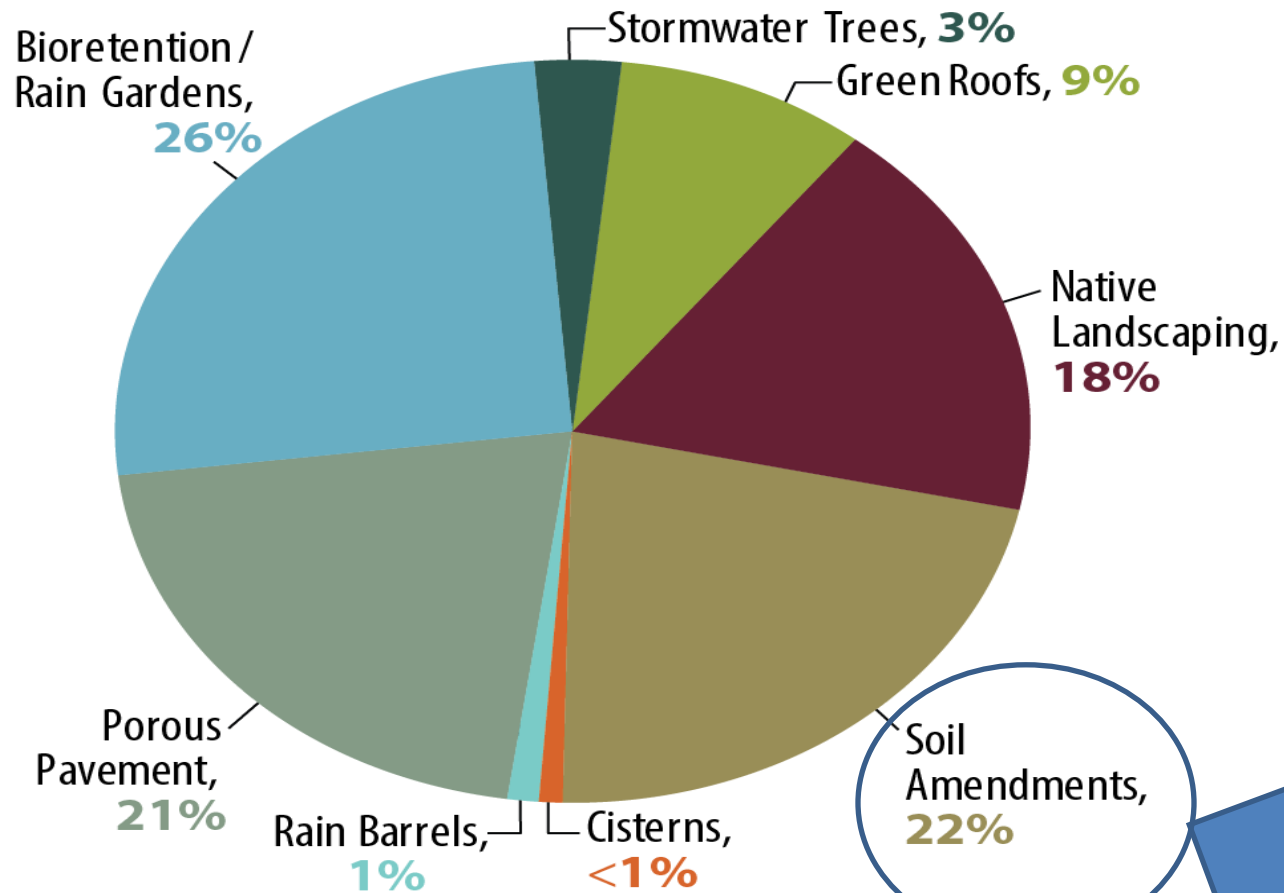
Green Roofs



GREEN ALLEYS, STREETS AND PARKING LOTS

Green Streets,
Alleys, Parking

The mix of Green





29,300 Plants Sold Since 2006

PSM's Rain barrels



More than
18,000
SOLD
Since 2002

Green Roofs

+10 acres

since 2003



More Green Roofs



A photograph of two deer in a lush green forest. One deer is standing in the background, looking towards the camera, while the other is in the foreground, looking to the left. The forest is filled with tall trees and dense foliage, with sunlight filtering through the leaves.

Greenseams®

2,660
Acres

Benefits at full implementation

Economic									
Green job opportunities	633 O&M; 161 construction jobs								
Reduced infrastructure costs in the CSSA	\$221.8 million compared to cost of GI in CSSA of \$179.5 Million								
Reduced pumping and treatment costs	Reduction in the need for deep tunnel pumping and associated treatment: \$1.3 million/year								
Increased property values	<p>Increase in property values due to aesthetic improvements from GI:</p> <table> <tr> <td>Residential:</td> <td>\$447.8 million</td> </tr> <tr> <td>Commercial:</td> <td>\$238.2 million</td> </tr> <tr> <td>Industrial:</td> <td>\$ 19.9 million</td> </tr> <tr> <td>Total:</td> <td>\$705.9 million</td> </tr> </table>	Residential:	\$447.8 million	Commercial:	\$238.2 million	Industrial:	\$ 19.9 million	Total:	\$705.9 million
Residential:	\$447.8 million								
Commercial:	\$238.2 million								
Industrial:	\$ 19.9 million								
Total:	\$705.9 million								

Benefits at full implementation

Social	
Improved quality of life and aesthetics	Recreational Area Increase: 275 acres Reduced Crime & Social Program Costs
Improved green space/recreational areas	Native landscaping: 8,600 acres Bio-retention/rain gardens: 670 acres Number of trees: 738,000

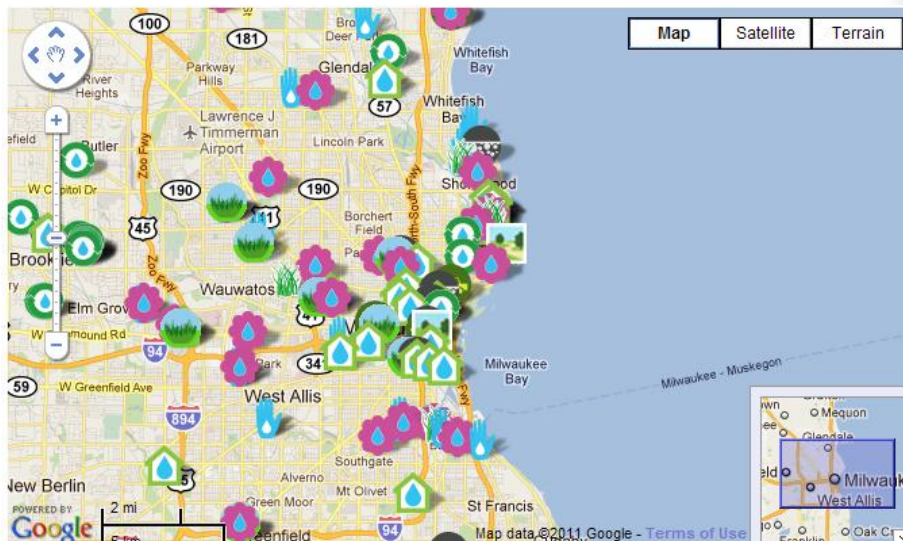
Benefits at full implementation

<u>Environmental</u>	
Captured stormwater runoff	740 MG new GI storage
Reduced pollutant loadings	Total suspended solids: 15.1 million pounds/year Total Phosphorus: 54,400 pounds/year
Carbon reduction	CO ₂ sequestered plus emissions avoided due to GI-related energy savings: 73,000 tons/year Reduction costs due to effects on human health, property damages from increased flood risk, etc. \$1.4 million/year

Benefits at full implementation

<u>Environmental</u>	
Reduced energy use for cooling	<p>Due to the insulating properties of green roofs and tree shading:</p> <p>16.5 million kWh/year</p> <p>Associated cost savings:</p> <p>\$1.5 to \$2.1 million</p>
Improved air quality	<p>Criteria air pollutants removed by trees plus emissions avoided due to GI-related energy savings:</p> <p>CO: 8 tons/year</p> <p>NO₂: 103 tons/year</p> <p>Ozone: 403 tons/year</p> <p>PM₁₀: 190 tons/year</p> <p>SO₂: 113 tons/year</p> <p>Human health benefit costs from NO₂ and SO₂ reductions:</p> <p>\$6.4 million/year</p>

Public Education



www.mmsd.com and
www.h2ocapture.com

5/19/2014

measuring greater milwaukee's future... one drop at a time.

Learn Calculate Map It Forum News Contact

Soak it up Challenge

Be Part of the Solution

We're striving to protect our rivers and lakes from water pollution by capturing **500 million gallons** of rain with green infrastructure during any given storm in the region. Up for the challenge?

Plant a rain garden. Install a rain barrel. Then, plug your info into our "Soak it Up" Calculator to see how we stack up as a region.

29.43%

McKinley Marina Park - Milwaukee, WI

Learn How To Capture Stormwater

Do you want to reduce stormwater pollution, conserve water and save money?

Green infrastructure allows us to collect and infiltrate stormwater by keeping it out of sewers and waterways, reducing flooding and basement back-ups. It can be as simple as connecting a rain barrel to your home or planting native vegetation.

Read more in our [Learn](#) section about how you can use green infrastructure to capture stormwater.

START HERE

Goal: **500,000,000 gals**
 Current: **147,172,919 gals**

FORUM

Recent MMSD Water News

August 27, 2011
FREE Rain Barrel Installation Demo with State Senator Lena Taylor
 August 27, 2011

August 06, 2011
MMSD Treated 99.8% of Stormwater in 2011

August 06, 2011
A Pocket Full of Stormwater

The Brewery - MMSD Signature Projects

The Brewery, a redevelopment project at the old Pilot Brewery site in Milwaukee, has taken sustainable stormwater management to the next level by holding, capturing, and evaporating stormwater runoff.

Milwaukee Co. Zoo - MMSD Signature Projects

The Milwaukee County Zoo added a green roof with special monitoring features on its conservation education building to its list of fantastic attractions. It was one of the first green roofs in Milwaukee.

Walnut Way Neighborhood - MMSD Signature Projects

The Walnut Way Conservation Corps has implemented rain barrels, cisterns, and rain gardens to capture rain water. They've also worked on an education and outreach program to promote sustainable living within the neighborhood.

H2O News:

- Green Streets Go Mainstream in Portland**
 Green Streets has become a community affair in Portland, Ore., where citizens can "adopt" a Green Street stormwater management facility in their neighborhood. The city sponsors Green Street maintenance training, which includes picking up trash, removing leaves and debris, and occasional weeding and watering.
- Asian carp: Battle lines are drawn at Chicago ship canal**
 The most contentious issue in the debate over Asian Carp is whether to barricade the superhighway for the fish -- and future invasive species -- created by the Chicago Sanitary and Ship Canal.
- Area Sewerage District Produces Helpful, Informative Video**
 After 3 years of massive storms the MMSD established a program to help reduce the risk of basement backups by reducing volumes of excess water entering into sanitary sewers from homes and businesses. MMSD also released an informative video to explain how this happens and what can be done.

Our Partners

Fund for Lake Michigan

sweet water
 SUSTAINABLE WATERWORKS PROJECT INC.

CES MILWAUKEE
 Office of Environmental Sustainability

Urban Water Sustainability Council
 Clean Water America Alliance

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Preserving The Environment
 Improving Water Quality



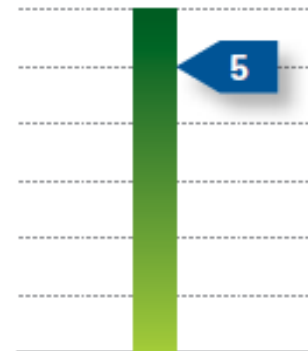
NATURAL RESOURCES DEFENSE COUNCIL

THE EARTH'S BEST DEFENSE

Rooftops to Rivers II

Green Strategies for
Controlling Storm water and
Combined Sewer Overflows

MILWAUKEE, WISCONSIN



Total Criteria Score
Out of a possible 6

EMERALD CITY CRITERIA*

- ☐ Long-term Green Infrastructure (GI) Plan?
- ☒ Existing requirement to use GI to reduce some portion of the existing impervious surfaces?
- ☒ Incentives for private-party actions?
- ☒ Retention Standard?
- ☒ Guidance or other affirmative assistance to accomplish GI within City?
- ☒ Dedicated funding source for GI?



A large, circular tunnel under construction. The tunnel walls are made of concrete and show signs of excavation. A small vehicle is visible at the far end of the tunnel, illuminated by bright lights. The perspective is from inside the tunnel, looking towards the exit.

Milwaukee Metropolitan Sewerage District's
Fiscal Condition:

**DOWNSTREAM ACCOMPLISHMENTS,
UPSTREAM CHALLENGES**

An independent third-party analysis



“MMSD enjoys sound fiscal health and appears well-positioned for the future.”

- Public Policy Forum

- Healthy operating budget
- Extensive and well-managed capital assets
- Sound performance

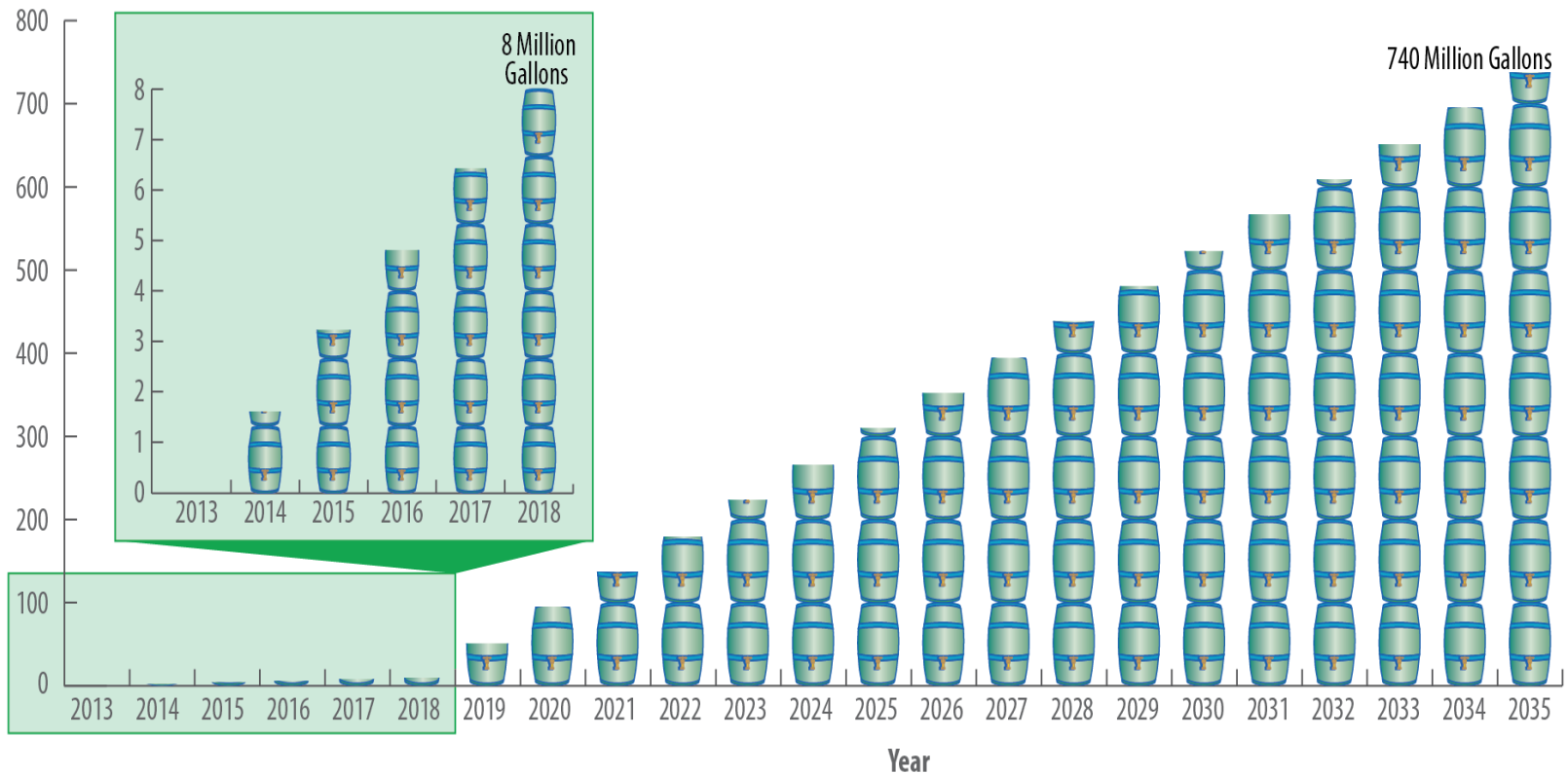
Southeastern WI Watersheds Trust

Success = A Regional Partnership



One step at a time...

Planning Area Rainfall Capture Volume
(Million Gallons)



Aesop's Tortoise (Green) and the Hare (Grey) Story



FRESH COAST 740
MILWAUKEE, WISCONSIN

The logo for Fresh Coast 740 features the word "FRESH" in green and "COAST" in blue, both in a large, sans-serif font. To the right of "COAST" is the number "740" in a smaller, grey font, with a stylized blue wave graphic underneath it. Below the main text, "MILWAUKEE, WISCONSIN" is written in a smaller, grey, sans-serif font.



Go
Green !

Go
Grey !

